

CLAIMS

WHAT IS CLAIMED:

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1. A method for forming a stackable wafer in an implantable device, comprising:
- forming an opening extending substantially through the wafer;
- depositing conductive material within the opening to substantially fill the opening;
- forming a bump on an upper surface of the wafer adjacent the conductive material;
- and
- forming a contact pad on a lower surface of the wafer adjacent the conductive material.
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2. The method set forth in claim 1 wherein forming an opening further comprises exposing a selected portion of the upper surface of the wafer to a reactive ion etching process for a preselected duration of time.
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3. The method set forth in claim 1 wherein depositing conductive material within the opening further comprises depositing at least one of copper, tungsten, nickel, and aluminum within the opening.
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4. The method set forth in claim 1 wherein depositing conductive material within the opening further comprises depositing a layer of conductive material over the upper surface of the wafer and within the opening, and removing a portion of the layer of conductive material overlying the upper surface of the wafer.

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5. The method set forth in claim 4 wherein removing a portion of the layer of conductive material further comprises performing a chemical mechanical polishing of the layer of conductive material to remove a portion of the layer of conductive material overlying the upper surface of the wafer.

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6. The method of claim 1 wherein forming a bump on an upper surface of the wafer further comprises forming a bump wherein at least a portion of a surface of the bump is wettable.

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7. The method of claim 1 wherein forming a contact pad on a lower surface of the wafer further comprises forming a contact pad wherein at least a portion of a surface of the contact pad is wettable.

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8. The method of claim 1 wherein forming an opening extending substantially through the wafer further comprises forming the opening extending substantially through a substrate of the wafer.
9. The method of claim 8 wherein forming an opening extending substantially through the wafer further comprises forming the opening extending substantially through a substrate of the wafer and any additional process layers formed on the substrate.

10. The method set forth in claim 1 wherein depositing conductive material within the opening further comprises depositing conductive material in contact with at least one conductive layer disposed within the wafer.

5 11. A method for forming a stacked arrangement of a first and second wafer in an implantable device, comprising:

forming an opening extending substantially through the first wafer;

depositing conductive material within the opening to substantially fill the opening in the first wafer;

10 forming a bump on an upper surface of the first wafer adjacent the conductive material;

forming a contact pad on a lower surface of the first wafer adjacent the conductive material;

forming an opening extending substantially through the second wafer;

15 depositing conductive material within the opening to substantially fill the opening in the second wafer;

forming a bump on an upper surface of the second wafer adjacent the conductive material;

20 forming a contact pad on a lower surface of the second wafer adjacent the conductive material;

positioning the first wafer adjacent the second wafer with the bump of the first wafer being adjacent the contact pad of the second wafer; and

coupling the bump of the first wafer with the contact pad of the second wafer.

12. The method set forth in claim 11 wherein coupling the bump of the first wafer with the contact pad of the second wafer further comprises soldering the bump of the first wafer with the contact pad of the second wafer.

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13. The method set forth in claim 11 wherein forming an opening in the first wafer further comprises exposing a selected portion of the upper surface of the first wafer to a reactive ion etching process for a preselected duration of time.

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14. The method set forth in claim 11 wherein depositing conductive material within the opening of the first wafer further comprises depositing at least one of copper, tungsten, nickel, and aluminum within the opening of the first wafer.

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15. The method set forth in claim 11 wherein depositing conductive material within the opening of the first wafer further comprises depositing a layer of conductive material over the upper surface of the first wafer and within the opening, and removing a portion of the layer of conductive material overlying the upper surface of the first wafer.

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16. The method set forth in claim 15 wherein removing a portion of the layer of conductive material further comprises performing a chemical mechanical

polishing of the layer of conductive material to remove a portion of the layer of conductive material overlying the upper surface of the first wafer.

5 17. The method of claim 11 wherein forming a bump on an upper surface of the first wafer further comprises forming a bump wherein at least a portion of a surface of the bump is wettable.

10 18. The method of claim 11 wherein forming a contact pad on a lower surface of the second wafer further comprises forming a contact pad wherein at least a portion of a surface of the contact pad is wettable.

15 19. The method of claim 11 wherein forming an opening extending substantially through the first wafer further comprises forming the opening extending substantially through a substrate of the first wafer.

20 20. The method of claim 19 wherein forming an opening extending substantially through the first wafer further comprises forming the opening extending substantially through the substrate of the first wafer and any additional process layers formed on the substrate.

21. The method set forth in claim 11 wherein depositing conductive material within the opening of the first wafer further comprises depositing conductive

